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ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/683,688	YAMAMOTO ET AL.	
	Examiner	Art Unit	
	Yaima Campos	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- . Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/9/03 11/29/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The instant application having Application No. 10/683,688 has a total of 20 claims pending in the application; there are 3 independent claims and 17 dependent claims, all of which are ready for examination by the examiner.

I. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63.**

II. STATUS OF CLAIM FOR PRIORITY IN THE APPLICATION

As required bye **M.P.E.P. 201.14(c)**, acknowledgement is made of applicant's claim for priority based on an application filed on June 23, 2003 (Foreign Priority 2003-177451).

III. INFORMATION CONCERNING DRAWINGS

Drawings

3. The applicant's drawings submitted are acceptable for examination purposes.

IV. ACKNOWLEDGEMENT OF REFERENCES CITED BY APPLICANT

4. As required by **M.P.E.P. 609(C)**, the applicant's submissions of the Information Disclosure Statements dated October 9, 2003 and November 29, 2004 are acknowledged by the examiner and the cited references have been considered in the examination of the

claims now pending. As required by **M.P.E.P 609 C(2)**, a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

V. REJECTIONS NOT BASED ON PRIOR ART

a. DEFICIENCIES IN THE SPECIFICATION

5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claims 1-10 and 12-18** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. As per **claim 1**, claim 1 recites the limitation "stores data to be used by the computer and a cache memory" in line 7. It is not clear whether this cache memory is claimed as a component of a "second control section" or as a device that uses data stored on a "second storage device." The examiner interprets the recited "cache memory" as a component of the "second control section." The applicant might consider amending this claim to read **--stores data to be used by the computer, a cache memory--**.

Claim 1 also recites the limitation "selects one of the second control section and the third control section" on lines 15-16. The examiner interprets this limitation as referring to selecting one of the two control sections, either the second or the third, but

not both. The applicant might consider amending this claim to read --**selects one of the second control section or the third control section**--.

9. As per **claim 12**, claim 12 recites the limitation "via one of the first path and the second path" on lines 9-10. The examiner interprets this limitation as referring to selecting one of the two paths, either the first path or the second path, but not both. The applicant might consider amending this claim to read -- **via one of the first path or the second path** --.

10. As per **claim 16**, claim 16 recites "in the first storage device to the first storage device" on lines 9-10. As best understood by the examiner, this recitation seems to repeat the same limitation two times. The applicant might consider amending this claim to read -- **in the first storage device** --.

11. As per **claim 17**, claim 17 recites the limitation "transmit an input/output request to the first storage device to the first storage system" on lines 17-18. The examiner interprets that there has been a typographical error and that this limitation should read – **transmit an input/output request to the first storage device of the first storage system"** --. Applicant might consider correcting this claim.

Any claim not specifically addressed above, is being rejected as encompassing the deficiencies of a claim upon which it depends.

VI. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. **Claims 11** are rejected under 35 U.S.C. 102(b) as being anticipated by Inoue et al. (US 5,459,856).

14. As per **claim 11**, Inoue discloses "a second storage system that is connected to a computer" **[With respect to this limitation Inoue discloses Controller 2 connected to CPU 1 (Figure1)]**

"and a first storage system including a first storage device" **[Magnetic disk drive 3 (Figure 1)]**

"the second storage system comprising: a first control section that is connected to the computer" **[Inoue discloses a first control section consisting of Control processors 110 and 111 and Channel Units 60 and 61 (Figure 1)]**

"a second control section that includes a second storage device and a cache memory" **[With respect to this limitation, Inoue discloses a second control section comprising Cache units 80 and 81 and Nonvolatile memory units 90 and 91 (Figure 1)]**

"a third control section that is connected to the first storage system;" **[Inoue discloses this limitation as Control section consisting of Control processors 120 and 121 and Control units 70 and 71 connected to Magnetic disk drive 3 (Figure 1)]**

"and an internal network that mutually connects the first control section, the second control section and the third control section" **[Data busses 60A-90B (Figure 1)]**

"wherein the first control section receives from the computer an input/output request to the first storage device," **[With respect to this limitation, Inoue discloses that "the**

channel control processor 110 or 111 receives a data read request from the CPU 1" (Column 4, lines 49-50)]

"and the first control section selects if the input/output request is transmitted to the first storage system via a first path defined by the internal network and the third control section" **[With respect to this limitation, Inoue discloses an input/output system wherein "if the data requested by the CPU is not present in any of the cache units 80 or 81 and the nonvolatile memory units 90 and 91, the channel control processor 110 or 111 (*first control section*) conveys the data read from the magnetic disk drive 3 to the control processor 120 or 121 (*third control section*)" (Column 4, lines 57-61) as a first path used for data input/output wherein data transmission only occurs between a first control section, an internal network and a third control section. Inoue also discloses the use of "data bus between 70A and 71B (*internal network*)" to accomplish this transfer]**

"or if the input/output request is transmitted to the first storage system via a second path defined by the internal network, the second control section and the third control section" **[With respect to this limitation, Inoue discloses an input/output system wherein write data is sent from CPU 1 to control processors 110 or 111 and channel units 60 and 61 (*first control section*) to cache units 80 and 81 or nonvolatile memory units 90 and 91 (*second control section*) and one of the data buses 60A, 60B, 61A and 61B (*internal network*) to control units 70 or 71 and control processors 120 and 121 (*third control section*) (Column 4, lines 37-48) as a second path defined by a first control unit, an internal network, a second control unit and a third control unit].**

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. **Claims 1-10, 12-15 and 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (US 5,459,856) in view of Ofek et al. (US 6,356,977).

17. As per **claim 1**, Inoue discloses "a second storage system that is connected to a computer" **[With respect to this limitation Inoue discloses Controller 2 connected to CPU 1 (Figure1)]** "and a first storage system including a first storage device," **[Magnetic disk drive 3 (Figure 1)]** "the second storage system comprising: a first control section that is connected to the computer;" **[Inoue discloses a first control section consisting of Control processors 110 and 111 and Channel Units 60 and 61 connected to CPU 1 (Figure 1)]** "a second control section that includes a second storage device that stores data to be used by the computer and a cache memory, and controls an input/output of data to the second storage device and the cache memory;" **[With respect to this limitation, Inoue discloses a second control section comprising Cache units 80 and 81 and Nonvolatile memory units 90 and 91 (Figure 1). Inoue also discloses a "cache mechanism for responding to an access request from the host to the rotating storage" (Column 1, lines 62-64)]** "a third control section that is connected to the first storage system" **[Inoue discloses this limitation as a third control section consisting of Control processors 120 and 121 and Control units 70 and 71 connected to Magnetic disk drive 3 (Figure 1)]** "and an internal network that mutually connects the first control

section, the second control section and the third control section" **[Data busses 60A-90B (Figure 1)]** "wherein the first control section receives from the computer a first input/output request" **[With respect to this limitation, Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61" (Column 4, lines 49-51)]** "having first identification information indicative of a storage device to be accessed" **[With respect to this limitation, Inoue discloses that read/write commands are exchanged between different components of the input/output data storage system containing command and address identification information as shown in (Figure 3)]**. Inoue also discloses a system for input/output of data wherein a first controller selects "one of the second control section and the third control section to which a second input/output request" is sent **[With respect to this limitation, Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61," if the contents are found in cache or nonvolatile memory (*second control section*), the request is processed; but if the requested data is not found in cache or nonvolatile memory, the request is sent to control processors 120 or 121 (*third control section*) (Column 4, lines 49-67)]**.

Inoue does not disclose expressly an input/output of data wherein input/output requests use "first identification information indicative of a storage device to be accessed" to decide which storage device is to be accessed to complete a data transfer.

Ofek discloses an input/output system wherein input requests use "first identification information indicative of a storage device to be accessed" **[Ofek teaches that information about each device in the data storage system "is stored in**

hierarchical format in the data map/table" (Column 7, lines 29-33) and that for every write request, "the data storage system 16 determines which device or disk drive 17a-17n the data element is stored on and then checks the appropriate indicator flag bit for that device" (Column 7, lines 63-66), further explains that for every read request, "the second storage system 16, by scanning data map/table 24, determines whether or not the data requested is stored on the first data storage system 14 or on the second data storage system 16" (Column 6, lines 16-21). Ofek's data map defines where to send a certain input/output request; therefore, identification information for each input/output request must be used].

Inoue (US 5,459,856) and Ofek (US 6,356,977) are analogous art because they are from the same field of endeavor of input/out of data in a system having multiple storage locations.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to make the data input/output storage system having multiple storage locations described by Inoue include information to identify the storage device to be accessed for every read/write request and send this request to the appropriate storage device as described by Ofek.

The motivation for doing so; as taught by Ofek, would have been that having information to identify the storage device to be accessed for every read/write request allows a data storage system to [**"quickly determine whether any data storage location having a lower level than the volume or other similar logical or physical partition being examined has the particular attribute, without scanning or searching each and every lower level data storage location" (Column 8, lines 9-14)**].

Therefore, it would have been obvious to combine Ofek (US 6,356,977) and Inoue (US 5,459,856) for the benefit of creating an input/out of data in a system having multiple storage locations to obtain the invention as specified in **claim 1**.

18. As per **claim 2**, Inoue discloses a system wherein "the first control section converts the first input/output request to the second input/output request and transmits the second input/output request to the second control section" **[With respect to this limitation, Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61," and forwards this request to a (*second control section*); if the contents are found in cache or nonvolatile memory (*second control section*), the request is processed (Column 4, lines 49-67)]**. Accordingly, Inoue explains that if the storage system to which the input/output request is directed is the second storage device **[As disclosed by Inoue; nonvolatile memory unit 90 or 91 (Figure 1)]** which is equivalent to having "information identification being correlated to the second storage device," the read/write request would be processed by a second control section and would have been sent from a first control section **[As disclosed by Inoue; channel processor 110 or 111 (Figure 1)]**.

19. As per **claim 3**, Inoue discloses "a second storage system, wherein the first identification information is correlated to the first storage device," **[With respect to this limitation, Inoue discloses that if the requested data is not found in "cache 80 or 81" or in "nonvolatile memory unit 90 or 91"; then "the channel control processor 110 or 111 conveys the data read from the magnetic disk drive 3 (*First storage device*) to the control unit processor 120 or 121" (Figure 1 and Column 4, lines 57-67)]** "and the first control section selects one of the second control section and the third control section

to which the second input/output request is transmitted" **[With respect to this limitation, Inoue explains that if the requested data belongs to "Magnetic disk unit 3, channel control processor 110 or 111 (*first control section*)" receive a read/write request from "CPU 1" and forwards this request to cache unit 80 or 81 (*second control section*) and if the requested data is not found in cache, then the read/write request is forwarded to control processor 120 or 121 (*third control section*) (Figure 1 and Column 4, lines 37-67)]**.

20. As per **claim 4**, Inoue discloses "a second storage system, wherein the first control section transmits the second input/output request having the identification information of the second control section to the second control section when a processing concerning the first input/output request is executed by the second control section." **[With respect to this limitation, Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61," and forwards this request to a (*second control section*); if the contents are found in cache or nonvolatile memory (*second control section*), the request is processed (Column 4, lines 49-67)]**.

21. As per **claims 5, 6, 7 and 8**, Inoue discloses "a second storage system, wherein the second control section receives the second input/output request, converts the second input/output request to a third input/output request having identification information of the first storage system, and transmits the third input/output request to the third control section" when "processing concerning the first input/output request or the first storage device is not executed by the second control section" or "transmits the second input/output request having identification information of the second control section to the

second control section, when a processing concerning the first storage device is executed by the second control section." **[With respect to these limitations, Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61," if the contents are found in cache or nonvolatile memory (*second control section*), the request is processed; but if the requested data is not found in cache or nonvolatile memory, the request is sent to control processors 120 or 121 (*third control section*) to be processed and this would encompass and instance when a request is not processed in a second control section (Column 4, lines 49-67)]**.

As per **claims 9 and 10**, Inoue discloses "a second storage system according to claim 3" **[See rejection to claim 3 above]** wherein "a first control section converts the first input/output request to the second input/output request having identification information of the second control section, and transmits the second input/output to the second control section" **[With respect to these limitations, Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61," if the contents are found in cache or nonvolatile memory (*second control section*), the request is processed (Column 4, lines 49-67). Identification information for a data request must correspond to a device where this data request is to be processed]**.

Inoue does not disclose expressly that this system further comprises "a management adaptor that manages the first control section, the second control section and the third control section, wherein the management adaptor manages identification information of a storage device correlated to the first identification information."

Ofek discloses "a management adaptor that manages the first control section, the second control section and the third control section, wherein the management adaptor manages identification information of a storage device correlated to the first identification information." Ofek teaches an input/output system wherein information about each device in the data storage system **["is stored in hierarchical format in the data map/table" (Column 7, lines 29-33)]**. This data map/table would accomplish the functionality of a management adaptor, as described by Applicant because for every write request **["the data storage system 16 determines which device or disk drive 17a-17n the data element is stored on and then checks the appropriate indicator flag bit for that device" (Column 7, lines 63-66)]**. Ofek also discloses that **["if the particular indicator flag bit is not set for that device, then the second data storage system knows immediately that no lower level storage unit or location such as a volume or track in that device has that attribute" (Columns 7-8, lines 66-67 and 1-3)]** as the method used to manage the contents of storage devices in the system. Ofek further explains that for every read request **["the second storage system 16, by scanning data map/table 24, determines whether or not the data requested is stored on the first data storage system 14 or on the second data storage system 16" (Column 6, lines 16-21)]**. Ofek's data map/table controls the system's controllers and other devices in such a way that this data map/table manages all the identification information related to input/output requests and every device in the system; therefore, this data table/map offers functionality equivalent to "the management adaptor" alleged by Applicant.

Inoue (US 5,459,856) and Ofek (US 6,356,977) are analogous art because they are from the same field of endeavor of input/out of data in a system having multiple storage locations.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to make the data input/output system having multiple storage locations described by Inoue include a "management adaptor" to manage controller sections and storage devices and also manage identification information for every read/write request, as disclosed by Ofek.

The motivation for doing so would have been because Ofek explains that the existence of a data map/table to manage devices in a storage system and to manage identification information related to input/output requests allows a storage system to **["quickly determine whether any data storage location having a lower level than the volume or other similar logical or physical partition being examined has the particular attribute, without scanning or searching each and every lower level data storage location" (Column 8, lines 9-14)]**.

Therefore, it would have been obvious to combine Ofek (US 6,356,977) and Inoue (US 5,459,856) for the benefit of creating an input/out of data in a system having multiple storage locations to obtain the invention as specified in claims 9 and 10.

22. As per **claim 12**, Inoue discloses, "a second storage system according to claim 11," **[See rejection to claim 11 above]** wherein "the third control section is connected to the first storage system" **[Inoue discloses this limitation as Control section consisting of Control processors 120 and 121 and Control units 70 and 71 connected to Magnetic disk drive 3 (Figure 1)]**. Inoue teaches that a "first control section, the second

control section and the third control section, and is connected to the internal network" **[First control section consisting of Control processors 110 and 111 and Channel Units 60 and 61 connected to CPU 1, a second control section comprising Cache units 80 and 81 and Nonvolatile memory units 90 and 91, a third control section consisting of Control processors 120 and 121 and Control units 70 and 71 and internal network consisting of Data busses 60A-90B (Figure 1)]**. Inoue also discloses, "transmitting to the first storage system an input/output request to the first storage device via one of the first path and the second path" **[With respect to this limitation, Inoue discloses an input/output system wherein "if the data requested by the CPU is not present in any of the cache units 80 or 81 and the nonvolatile memory units 90 and 91, the channel control processor 110 or 111 (*first control section*) conveys the data read from the magnetic disk drive 3 to the control processor 120 or 121 (*third control section*)" (Column 4, lines 57-61) as a first path used for data input/output wherein data transmission only occurs between a first control section, an internal network and a third control section. Inoue also discloses a second path wherein write data is sent from CPU to control processors 110 or 111 and channel units 60 and 61 (*first control section*) to cache units 80 and 81 or nonvolatile memory units 90 and 91 (*second control section*) to control units 70 or 71 and control processors 120 and 121 (*third control section*) (Column 4, lines 37-48) as a second path defined by a first control unit, an internal network, a second control unit and a third control unit]**.

Inoue does not disclose expressly that "the second storage system" further comprises "a management adaptor that manages the first control section, the second

control section and the third control section;" neither is it discloses that "the management adaptor sets to transmit" input/output requests to a corresponding device.

Ofek discloses "a management adaptor that manages the first control section, the second control section and the third control section;" and "sets to transmit" input/output requests to a corresponding device. Ofek teaches an input/output system wherein information about each device in the data storage system **["is stored in hierarchical format in the data map/table" (Column 7, lines 29-33)]**. This data map/table would accomplish the functionality of a management adaptor, as described by Applicant because for every write request **["the data storage system 16 determines which device or disk drive 17a-17n the data element is stored on and then checks the appropriate indicator flag bit for that device" (Column 7, lines 63-66)]**. Ofek also discloses that **["if the particular indicator flag bit is not set for that device, then the second data storage system knows immediately that no lower level storage unit or location such as a volume or track in that device has that attribute" (Columns 7-8, lines 66-67 and 1-3)]** as the method used to manage the contents of storage devices in the system. Ofek further explains that for every read request **["the second storage system 16, by scanning data map/table 24, determines whether or not the data requested is stored on the first data storage system 14 or on the second data storage system 16" (Column 6, lines 16-21)]**. Ofek's data map/table controls the system's controllers and other devices in such a way that this data map/table defines where to send a certain input/output request; therefore, this data table/map offers functionality equivalent to "the management adaptor" alleged by Applicant.

Inoue (US 5,459,856) and Ofek (US 6,356,977) are analogous art because they are from the same field of endeavor of input/out of data in a system having multiple storage locations.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to make the data input/output system having multiple storage locations described by Inoue include a "management adaptor" as disclosed by Ofek.

The motivation for doing so would have been because Ofek explains that the existence of a data map/table to manage devices in a storage system and set to transmit input/output requests to an appropriate device allows a storage system to **["quickly determine whether any data storage location having a lower level than the volume or other similar logical or physical partition being examined has the particular attribute, without scanning or searching each and every lower level data storage location" (Column 8, lines 9-14)]**.

Therefore, it would have been obvious to combine Ofek (US 6,356,977) and Inoue (US 5,459,856) for the benefit of creating an input/out of data in a system having multiple storage locations to obtain the invention as specified in claim 12.

23. As per **claim 13**, the combination of Inoue and Ofek discloses "a second storage system according to claim 12, wherein the management adaptor" is responsible for transmitting input/output requests between different parts of an input/output system **[See rejection to claim 12 above]**. Inoue further teaches the transmission of "an input/output request to the first storage system via the second path, when a processing concerning the first storage device is executed by the second control section" **[With respect to these limitations, Inoue discloses that "channel control processor 110 or 111 (*first control***

***section*) receives a data request from CPU through channel unit 60 or 61;" this request may be for data of the "Magnetic disk drive 3" residing in cache or for data of the nonvolatile memory unit 90 or 91, and if the contents are found in cache or nonvolatile memory (*second control section*), the request is processed (Column 4, lines 38-56)]**.

24. As per **claim 14 and 15**, the combination of Inoue and Ofek discloses "a second storage system according to claim 12, wherein the management adaptor" is responsible for transmitting input/output requests between different parts of an input/output system **[See rejection to claim 12 above]**. Inoue also discloses changing "a path for transmitting an input/output request to the first storage device to the first storage system" if "processing concerning the first storage device is not executed by the second control section," as it is taught that **["channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61;" this request may be for data of the "Magnetic disk drive 3" (*first storage device*) residing in cache, and if the contents are found in cache (*second control section*), the request is processed; but if the requested data is not found in cache or nonvolatile memory; which means that processing would not occur in this second control section, the request is sent to control processors 120 or 121 (*third control section*) to be processed (Column 4, lines 49-67); demonstrating how the paths for the transmission of data may be changed, depending on where requested data is found and where requests are processed in an input/output storage system]**.

25. As per **claim 18**, the combination of Inoue and Ofek discloses "a second storage system according to claim 12," **[See rejection to claim 12 above]** "wherein, when a

processing concerning the first storage device needs to be executed by the second control section," **[With respect to this limitation, Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61," and forwards this request to a (*second control section*); if the contents are found in cache or nonvolatile memory (*second control section*), the request is processed (Column 4, lines 49-67). Inoue mentions that "the capacity of cache units 80 and 81, for example, is determined to permit a sufficient individual cache operation compatible to a memory capacity of the magnetic disk drive 3," (Column 3, lines 62-65) which means that cache 80 and 81 are used for caching data that belongs to magnetic disk drive 3]**. The combination of Inoue and Ofek also discloses that "the management adaptor sets to change a path" **[See rejection to claim 12 above]** that is used to transmit an input/output request to the first storage system from the first path to the second path" **[Inoue discloses that "channel control processor 110 or 111 (*first control section*) receives a data request from CPU through channel unit 60 or 61;" this request may be for data of the "Magnetic disk drive 3" (*first storage device*) residing in cache, and if the contents are found in cache (*second control section*), the request is processed; but if the requested data is not found in cache or nonvolatile memory; which means that processing would not occur in this second control section, the request is sent from channel control processor 110 or 111 to control processors 120 or 121 (*third control section*) to be processed (Column 4, lines 49-67); demonstrating how the paths for the transmission of data may be changed, depending on where requested data is found and where requests are processed in an input/output storage system]**. Ofek discloses

that [**"the data storage system 16 determines which device or disk drive 17a-17n the data element is stored on and then checks the appropriate indicator flag bit for that device" (Column 7, lines 63-66) and that "the second storage system 16 is first coupled to the first data storage system 14 by means of one or more data communication links or paths 20a, 20b" (Column 5, lines 44-46); therefore, once that data table/map (*management adaptor*) indicates the device where requested data may be found in the system, the path to send this data may be chosen/changed, depending on the location indicated by "the flag bits" used in the system]**.

26. As per **claim 19**, Inoue discloses "a method for connecting a storage system that is connected to a computer to another storage system," **[With respect to this limitation Inoue discloses a storage system consisting of Controller 2 including Nonvolatile Memory Units 90 and 91 connected to CPU 1 connected by busses 5 to another storage system consisting of Magnetic disk drive 3 (Figure1)]**"the storage system including a first control section connected to the computer," **[Control section consisting of Control processors 110 and 111 and Channel Units 60 and 61 connected to CPU 1 (Figure 1)]** "a second control section having a storage device and a cache memory," **[With respect to this limitation, Inoue discloses control section comprising Cache units 80 and 81 and Nonvolatile memory units 90 and 91 (Figure 1). Inoue also discloses a "cache mechanism for responding to an access request from the host to the rotating storage" (Column 1, lines 62-64)]** "a third control section that is to be connected to the other storage system," **[Inoue discloses this limitation as Control section consisting of Control processors 120 and 121 and Control units 70 and 71 connected to the other storage system consisting of Magnetic disk drive 3 (Figure 1)]**

"and an internal network that mutually connects the first control section, the second control section, the third control section" **[Data busses 60A-90B (Figure 1)]** "the method comprising the steps of connecting the other storage system to the third control section;" **[With respect to this limitation, Inoue discloses a third control section consisting of Control processors 120 and 121 and Control units 70 and 71 connected to a storage system consisting of Magnetic disk drives (Figure 1)]** "receiving by the first control section from the computer an input/output request to data stored in a storage device in the other storage system;" **[With respect to this limitation, Inoue discloses that "control processor 110 or 111 (*first control section*) receives a data read request form the CPU 1" and if the requested data is not found in cache units 80 or 81 or in nonvolatile memory units 90 or 91 (*second control section*); then "the channel control processor 110 or 111 conveys the data read from the magnetic disk drive 3 to the control processor 120 or 121 (*third control section*)"]**. Inoue also discloses "transmission of the input/output request to the other storage system via one of a first path defined by the internal network and the third control section," **[With respect to this limitation, Inoue discloses an input/output system wherein "if the data requested by the CPU is not present in any of the cache units 80 or 81 and the nonvolatile memory units 90 and 91, the channel control processor 110 or 111 (*first control section*) conveys the data read from the magnetic disk drive 3 to the control processor 120 or 121 (*third control section*)" (Column 4, lines 57-61) as a first path used for data input/output wherein data transmission only occurs between a first control section, an internal network and a third control section]** "and a second path defined by the internal network, the second control section and the third control section"

[With respect to this limitation, Inoue discloses an input/output system wherein write data is sent from CPU to control processors 110 or 111 and channel units 60 and 61 (*first control section*) to cache units 80 and 81 or nonvolatile memory units 90 and 91 (*second control section*) to control units 70 or 71 and control processors 120 and 121 (*third control section*) (Column 4, lines 37-48) as a second path defined by a first control unit, an internal network, a second control unit and a third control unit].

Inoue does not disclose expressly a an input/output system including a "a management adaptor that manages the first control section, the second control section and the third control section," and "transmits the input/output request to the other storage system."

Ofek discloses "a management adaptor that manages the first control section, the second control section and the third control section," and "transmits the input/output request to the other storage system." Ofek teaches an input/output system wherein information about each device in the data storage system **["is stored in hierarchical format in the data map/table" (Column 7, lines 29-33)]**. This data map/table would accomplish the functionality of a management adaptor, as described by Applicant because for every write request **["the data storage system 16 determines which device or disk drive 17a-17n the data element is stored on and then checks the appropriate indicator flag bit for that device" (Column 7, lines 63-66)]**. Ofek also discloses that **["if the particular indicator flag bit is not set for that device, then the second data storage system knows immediately that no lower level storage unit or location such as a volume or track in that device has that attribute" (Columns 7-8, lines 66-67 and**

1-3)] as the method used to manage the contents of storage devices in the system. Ofek further explains that for every read request **["the second storage system 16, by scanning data map/table 24, determines whether or not the data requested is stored on the first data storage system 14 or on the second data storage system 16" (Column 6, lines 16-21)]**. Ofek's data map/table controls the system's controllers and other devices in such a way that this data map/table defines where to send a certain input/output request; therefore, this data table/map offers functionality equivalent to "the management adaptor" alleged by Applicant.

Inoue (US 5,459,856) and Ofek (US 6,356,977) are analogous art because they are from the same field of endeavor of input/out of data in a system having multiple storage locations.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to make the data input/output system having multiple storage locations described by Inoue include a "management adaptor" as disclosed by Ofek.

The motivation for doing so would have been because Ofek explains that the existence of a data map/table to manage devices in a storage system and set to transmit input/output requests to an appropriate device allows a storage system to **["quickly determine whether any data storage location having a lower level than the volume or other similar logical or physical partition being examined has the particular attribute, without scanning or searching each and every lower level data storage location" (Column 8, lines 9-14)]**.

Therefore, it would have been obvious to combine Ofek (US 6,356,977) and Inoue (US 5,459,856) for the benefit of creating an input/out of data in a system having multiple storage locations to obtain the invention as specified in claim 19.

27. As per **claim 20**, the combination of Inoue and Ofek discloses "a method according to claim 19, wherein the management adaptor is connected to a management device via a network," **[See rejection to claim 19 above]** "further comprising the steps of receiving by the management adaptor from the management device a change instruction to change a connection path; and changing by the management adaptor a setting based on the change instruction to change a path that is used to transmit an input/output request to data stored in a storage device in the other storage system." **[With respect to this limitation, Ofek discloses that "the data storage system 16 determines which device or disk drive 17a-17n the data element is stored on and then checks the appropriate indicator flag bit for that device" (Column 7, lines 63-66)]**. Ofek also discloses that **["if the particular indicator flag bit is not set for that device, then the second data storage system knows immediately that no lower level storage unit or location such as a volume or track in that device has that attribute" (Columns 7-8, lines 66-67 and 1-3) as a way of keeping track of the path that will be used to send requested data. Ofek further discloses that "if any lower data storage element in the hierarchical structure such as a track or volume includes the attribute, then the attribute or flag bit for that device will be set" (Column 8, lines 3-5) as the method used to manage storage devices in a storage system and paths used to send data. It is also explained in this application that "the second storage system 16 is first coupled to the first data storage system 14 by means of one or more data communication**

links or paths 20a, 20b" (Column 5, lines 44-46); therefore, once that data table/map (*management adaptor*) indicates the device where requested data may be found in the system, the path to send this data may be chosen/changed, depending on the location indicated by "the flag bits" used in the system].

VII. RELEVANT ART CITED BY THE EXAMINER

28. The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.

29. The following references teach input/output storage systems that use multiple storage devices.

U.S. PATENT NUMBER
US 4,536,836
US 5,133,060
US 5,884,098
US 2002/0062429
US 5,734,813
US 6,098,129

VIII. CLOSING COMMENTS

Conclusion

a. STATUS OF CLAIMS IN THE APPLICATION

30. The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. 707.07(i)**:

a(1) SUBJECT MATTER CONSIDERED ALLOWABLE

31. Per the instant office action, claims 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and rewritten to overcome the rejection under 112 second paragraph.

The primary reasons for allowance of claims 16 and 17 in the instant application is the combination with the inclusion in these claims of the limitation of and input/out storage system wherein "**a second control section controls to release a storage region on the cache memory, and after the storage region on the cache memory is freed, the management adaptor changes the path that is used to transmit an input/output request to the first storage system.**"

The prior art of record including the disclosures under section **VII** above neither anticipates nor renders obvious the above recited combination.

a(2) CLAIMS REJECTED IN THE APPLICATION

32. Per the instant office action, claims 1-15 and 18-20 have received a first action on the merits and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES

33. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yaima Campos whose telephone number is (571) 272-1232 and email address is Yaima.Campos@uspto.gov. The examiner can normally be reached on Monday to Friday 8:00 AM to 4:30 PM.

IMPORTANT NOTE

34. If attempts to reach the above noted Examiner by telephone or email are unsuccessful, the Examiner's supervisor, Mr. Donald Sparks, can be reached at the following telephone number: Area Code (571) 272-4201.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

November 10, 2005

Yaima Campos
Examiner
Art Unit 2185

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SUPERVISORY PATENT EXAMINER